

A practical approach to assessing and managing sexual dysfunction in multiple sclerosis

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ABSTRACT

Sexual dysfunction is a common but under-reported and under-treated symptom in men and women with multiple sclerosis. Lack of knowledge of how to approach assessment and management of sexual dysfunction has been reported by neurologists as a major barrier to discussing this with patients. This review provides an overview of the domains of sexual function that can be affected and common clinical presentations. We discuss the various factors that can contribute to sexual dysfunction in multiple sclerosis and provide a practical strategy for neurologists to assess and manage these patients, using two typical case studies to highlight this approach.

INTRODUCTION

Multiple sclerosis (MS) is a chronic inflammatory demyelinating disorder affecting the central nervous system (CNS). It is the most common cause of neurological disability in young adults who may be sexually active. Sexual dysfunction has been reported to affect an estimated 50-90% of men and 40-80% of women with MS[1–3], which is greater than the reported prevalence in the general population of 20-30% in men and 40-45% in women[4]. Sexual dysfunction can arise at any time, with one study reporting that one-third of newly diagnosed women were affected despite no major neurological impairment[5].

Sexual dysfunction significantly impacts mental and physical health-related quality of life, even after adjusting for factors such as disability status and relationships. However, it is an under-reported, under-recognised, and under-treated symptom in MS. Patients with MS and healthcare professionals experience a number of barriers to addressing sexual dysfunction in clinic, with lack of knowledge about sexual dysfunction cited as a major reason by the latter[6]. Moreover, there are substantially more treatment strategies, particularly pharmacological options, for men compared to women. Here we review the clinical presentations, causes and contributing factors of sexual dysfunction in male and female patients with MS, as well as assessment and management strategies.

CLINICAL PRESENTATION OF SEXUAL DYSFUNCTION IN MS

In health, sexual function depends on the interplay between neurological, vascular, hormonal and psychological mechanisms. Different models of the human sexual response cycle have

been proposed[7,8]. In males, the physiology of sexual function can be divided into libido, arousal, erection, ejaculation, orgasm and detumescence, while in females, following arousal, the corresponding physiological response to erection is increased vaginal blood flow and lubrication, resulting in engorgement of the clitoris[9]. This may be followed by orgasm then resolution.

An understanding of the physiology sets the foundation for categorising sexual dysfunction in men and women with MS under four main headings: 1) loss of sexual desire, 2) failure of arousal (erectile dysfunction in men and vaginal dryness or failure of clitoral engorgement and lubrication in women), 3) orgasmic dysfunction (delayed, absent or premature ejaculation) and 4) sexual pain disorders (such as vaginismus and dyspareunia)[10,11].

The commonest presentations of sexual dysfunction in men with MS are erectile dysfunction (50-75%), ejaculatory dysfunction (50%), reduced libido (39%) and anorgasmia (37%)[12]. In contrast, for women reduced libido (31.4-63.6%), arousal and vaginal lubrication (33-51.5%) and orgasm (37-38.3%) are the most frequent complaints[10]. Hypersexuality has been rarely reported in MS.

Table 1: Domains of sexual function affected in men and women

Sexual response	Male symptoms	Female symptoms
Libido, sexual desire	Reduced or absent sexual desire, interest or motivation Rarely hypersexuality	
Genital arousal	Erectile dysfunction	Vaginal dryness, reduced vaginal lubrication

Orgasm/ ejaculation	Reduced, delayed or absent orgasm Delayed, absent or premature ejaculation	Reduced, delayed or absent orgasm
Sexual pain		Dyspareunia, vaginismus

MULTIDIMENSIONAL FACTORS CONTRIBUTING TO SEXUAL DYSFUNCTION IN MS

Primary, secondary and tertiary factors can contribute to sexual dysfunction in MS (Table 2)[10,13]. Whilst this provides a useful framework for recognising factors that underpin sexual dysfunction, in reality the problems experienced by patients are often due to interplay of factors across the three different categories. The utility of adopting this structured approach is demonstrated in case 1.

Primary sexual dysfunction

Primary sexual dysfunction results from demyelinating nervous system lesions and neuroaxonal loss affecting the neural pathways in the brain and spinal cord that regulate sexual function. PET and functional MRI studies have demonstrated that sexual drive and arousal are centrally driven, with limbic and paralimbic regions activation playing an important role[12]. Brainstem lesions and total lesion load are correlated with anorgasmia[14] and pontine atrophy with erectile dysfunction in men with MS[15], although caution is required in interpreting these results because of small sample sizes.

Peripheral control of sexual functions is through the motor and sensory somatic pathways (via the pudendal nerve), thoracolumbar (T10-L2) sympathetic and sacral (S2-S4) parasympathetic systems. The parasympathetic system regulates engorgement of the vascular tissue within the penis and clitoris. Ejaculation is primarily under sympathetic control, but also requires parasympathetic input for accessory gland peristalsis as well as a somatically-innervated pelvic floor contraction[16]. In MS, spinal cord lesions have been implicated as a major cause of erectile dysfunction. Initially this may be partial, with nocturnal and morning erections still present. With progressive disability there can be a complete loss of erectile function[12].

Secondary sexual dysfunction

A range of MS-related neurological symptoms and physical disabilities can affect sexual functions (Table 2). Cross-sectional studies report a relationship between sexual dysfunction and bladder dysfunction, fatigue, cognitive impairment[17] and spasticity[18]. In a structured interview 76.6% of women with advanced MS reported symptoms of pelvic floor muscle weakness and 60% experienced reduced genital sensitivity, which correlated with orgasmic quality[19].

Tertiary sexual dysfunction

The psychosocial and emotional burden associated with living with MS can negatively impact sexual functions. Depression and mood disorders in MS are common (lifetime risk up to 54% compared to 12.9% of patients with chronic medical conditions and 9.7% in the

general population[20]), multifactorial in cause and can lead to anhedonia and loss of libido. Significant associations have been observed between sexual dysfunction and depression or anxiety, low educational level, physical disorders and cognitive symptoms. In a prospective questionnaire-based study of over 200 women, high scores on the Beck Depression Inventory correlated with presence of sexual dysfunction[21].

Table 2: The multidimensional model exploring different factors that contribute to sexual dysfunction in MS

Primary	<ul style="list-style-type: none"> • Demyelinating lesions in the central nervous system
Secondary	<ul style="list-style-type: none"> • Immobility • Fatigue • Spasticity – painful adductor spasms • Tremor, poor coordination • Pain – neuropathic, musculoskeletal • Sensory symptoms – urogenital paraesthesia, dysaesthesia, allodynia • Bladder and bowel incontinence, use of catheter • Pelvic floor muscle weakness • Cognitive impairment, reduced attention and concentration • Visual impairment
Tertiary	<ul style="list-style-type: none"> • Emotional and psychosocial changes • Depression, anxiety • Anger, guilt, fear of rejection • Altered self-image, low self-esteem – related to change in appearance and physical ability, dependency on others

	<ul style="list-style-type: none"> • Communication difficulty • Change in relationships and partner roles
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Contributory medications

A number of medications commonly prescribed in MS can exacerbate sexual dysfunction (Table 3). Most notably, selective serotonin reuptake inhibitors (SSRIs) are well known to affect a range of domains of sexual function in men and women, including loss of libido, anorgasmia and impaired ejaculation. The incidence of SSRI-associated sexual dysfunction is estimated to be between 30% and 50% varying across studies, with no evidence of significant difference amongst different SSRIs[22]. Other relevant medications include 5 α -reductase inhibitors (e.g. finasteride), retinoids (e.g. isotretinoin), α -blockers (e.g. prazosin, tamsulosin) and several classes of antihypertensives (e.g. β -blockers, thiazide diuretics and potassium-sparing diuretics)[23].

Table 3: Medications for management of MS neurological symptoms known to affect sexual function and suggested alternatives[12]

MS symptom	Medication	Effect on sexual function	Alternatives with less impact on sexual functions
Spasticity	Baclofen	Erectile dysfunction, (rarely impaired ejaculation)	Benzodiazepines Clonidine
	Dantrolene	Decreased libido, Erectile dysfunction, retrograde ejaculation	

Pain	Tricyclic antidepressants	Erectile dysfunction, impaired ejaculation, anorgasmia, decreased libido	Gabapentin Carbamazepine Oxcarbazepine
	Duloxetine	Decreased libido, Erectile dysfunction, impaired ejaculation, anorgasmia	
	Lamotrigine	Erectile dysfunction	
	Valproate	Erectile dysfunction	
Fatigue	Amantadine	Decreased libido	Modafinil
	Amphetamine	Erectile dysfunction, decreased libido	
Depression	SSRI	Decreased libido, poor genital sensations, anorgasmia, impaired ejaculation	Mirtazapine Bupropion
	Venlafaxine	Erectile dysfunction, anorgasmia	
Bladder dysfunction	Antimuscarinics	Vaginal dryness	Mirabegron

ASSESSMENT

Broaching sexual dysfunction with patients

Sexual dysfunction is a difficult area for both patients and health care professionals to broach in clinic and an important factor that can impede a discussion is presence of family or friends in the consultation room. Other key barriers reported by patients include priority of other neurological symptoms and sexual problems not being enquired about during the conversation, whilst health care professionals reported lack of knowledge in the field and inadequate time during the appointment[6]. To provide a more conducive setting for initiating discussion about sexual difficulties, an opportunity should be provided for the patient to be seen alone in a safe and confidential environment. The use of open-ended questions and framing assessment of sexual dysfunction as part of a holistic approach to managing MS can encourage patients to divulge sensitive topics that may be perceived as embarrassing or taboo. Sometimes additional time may need to be built in to discuss this sensitive topic, either through arranging a double slot or another appointment. Requesting patients to complete a sexual dysfunction questionnaire prior to the consultation can be helpful (see History section below).

History

Evaluation of sexual dysfunction in MS is based on a comprehensive history and examination with the aims of defining the problem and specific domain(s) of sexual dysfunction affected according to Table 1, establishing the underlying contributing factors of sexual dysfunction (Table 2), assessing the impact of sexual dysfunction on the patient's life and clarifying patient expectations.

Embarrassment was one of the barriers experienced by both health care professionals and patients to addressing sexual dysfunction[6]. A useful approach is to enquire about less

embarrassing pelvic organ complaints such as bladder and bowel dysfunction, before stating that sexual problems also occur and asking whether the patient would like to discuss this. The key questions that should be asked are:

1. What is the onset and time course of sexual dysfunction in relation to MS and relapses?
2. How strong is your sex drive?
3. How easily are you sexually aroused (turned on)?
4. Male: Can you easily get and keep an erection?
Female: How easily does your vagina become moist or wet during sex?
5. How easily can you reach an orgasm?
6. Are your orgasms satisfying?
7. Is the patient currently in a sexual relationship and impact of symptoms on current or past relationships;
8. Obstetric and gynaecological history and menstrual status (in females).

Questions 2-6 have been derived from a validated simple questionnaire called the Arizona Sexual Experience Scale (ASEX)[24]. More elaborate assessments, especially in the setting of a research study are the Female Sexual Function Index (FSFI), which assesses desire, arousal, lubrication, orgasm, satisfaction and pain, Female Sexual Distress Scale (FSDS) which evaluates the degree of sexual dysfunction-related distress[12] and in men the International Index of Erectile Function (IIEF). The MS Intimacy and Sexuality Questionnaire-19 (MSISQ-19) is a validated self-report questionnaire that captures the primary, secondary and contributors to sexual dysfunction in men and women[25].

In men, erectile dysfunction is often the symptom that initiates discussion about sexual dysfunction. Questions should cover onset and duration of erectile problems and quality of erections, whether the problem is with achieving or maintaining an erection (or both) and erections achieved in different situations (such as through self-stimulation [masturbation], with a partner and morning erections). Other aetiologies (i.e. vasculogenic, urological, endocrine, psychogenic) need to be considered, as neurogenic erectile dysfunction is a diagnosis of exclusion.

Endocrine and psychogenic factors can also contribute to sexual dysfunction in women. Women in the menopause or reporting pain during penetrative intercourse vaginal dryness may have gynaecological causes contributing to sexual dysfunction. If any serious underlying disorder is suspected, the patient should be referred to an appropriate specialist (Table 4).

Examination

In the young MS patient, sexual dysfunction is most often neurogenic and performing a urogenital examination, while desirable, may not be practical for all patients in a busy neurology clinic. Furthermore, most neurologists are unfamiliar with performing a focused urogenital or pelvic examination. However, general physical inspection and basic cardiovascular assessment can be feasibly incorporated to screen for underlying endocrine or vasculogenic factors causing sexual dysfunction[26,27] (Table 4).

Investigations

Laboratory testing is not necessary in many cases of sexual dysfunction when a neurogenic cause is strongly suspected and tests should be tailored to risk factors and presence of comorbidities, with the aim of identifying reversible or modifiable causes of sexual dysfunction (Table 4). This includes HbA_{1c} or fasting glucose and lipid profile in patients with high cardiovascular risk as erectile dysfunction can be an early manifestation of atherosclerosis. While the National Institute of Health and Care Excellence (NICE) guidelines recommend checking testosterone level in all patients with erectile dysfunction, this may not be essential if a non-neurogenic cause is unlikely. Morning (8-10am) serum total testosterone level should be tested if hypogonadism is suspected clinically or if there is failure to respond to first-line treatment of erectile dysfunction. If the initial level is low (<12nmol/L) or borderline, repeat testosterone level, along with follicle-stimulating hormone, luteinising hormone and prolactin levels are then recommended[28].

Table 4: Evaluation for non-neurogenic causes of sexual dysfunction relevant and examples of indications for specialist referral[29,30]

Non-neurogenic causes	History	Examination findings	Suggested initial laboratory tests	Indication for specialist referral
Vasculogenic	Vascular risk factors (e.g. hypertension, hyperlipidaemia, diabetes mellitus, smoking and family history)	Hypertension High body mass index Absence of peripheral pulses	HbA _{1c} or fasting glucose, fasting lipid profile	Severe or unstable cardiovascular disease that would make sexual activity unsafe or contraindicates PDE-5 inhibitor,

				such as high-risk arrhythmias, unstable or refractory angina or recent myocardial infarction.
Urological	Painful, curvature or deviation of erection (it may be helpful for the patient to photograph penis when erect to assess this objectively)	Pre-malignant or malignant genital lesions Penile plaques or deformities (seen in Peyronie's disease, an inflammatory condition that can cause deformity of the penis)		Erectile dysfunction refractory to first line treatments Painful erections/ ejaculation Abnormalities of penis, testes and prostate on genital examination Haemospermia
	Men aged over 50 Obstructive urinary symptoms Prolonged or intermittent ejaculation	Prostatic enlargement, irregularity or nodularity on digital rectal examination	Prostate specific antigen (PSA)	

	Personal or family history of prostate cancer			
Gynae-cological	Sexual pain Post-coital spotting Vaginal dryness Sensation of perineal pressure, bulge, heaviness or dragging may suggest pelvic organ prolapse History of pelvic surgery, trauma, infection	Vulvovaginal atrophy (loss of labial fat pad, thinning of labia minora, pale mucosa, loss of vaginal folds) Pelvic organ prolapse Pelvic muscle dysfunction Skin changes and infections		Significant pain (dyspareunia) or difficulty (vaginismus) with attempted vaginal penetration or intercourse Symptomatic pelvic organ prolapse Anatomical, structural, dermatological or pelvic inflammatory disorders
Endocrine	Men Reduced libido Weak morning erections Symptoms of hypogonadism such as reduced body	Reduced body hair, testicular atrophy, gynaecomastia	Morning (8am-10am) serum total testosterone level	Features of hypogonadism or other endocrinopathy on examination or laboratory tests

	<p>hair, gynaecomastia, testicular atrophy</p> <p>Failure to respond to first-line therapy for erectile dysfunction</p>			
	<p>Women</p> <p>Amenorrhoea, oligomenorrhoea</p> <p>Vaginal dryness</p> <p>Hot flashes</p> <p>Reduced libido</p>		<p>Follicle stimulating hormone</p>	
	<p>Specific features of other endocrinopathies (e.g. hyper- and hypothyroidism, hyper- and hypocortisolism, hyperprolactinaemia, panhypopituitarism)</p>		<p>Relevant hormone levels</p>	
<p>Psycho- genic</p>	<p>Sudden onset of symptoms</p> <p>Decreased libido</p>			<p>Major psychological comorbidities contributing to sexual dysfunction</p>

	<p>Good quality spontaneous or self-stimulated erections</p> <p>Major life events or relationship changes</p> <p>History of psychological problems</p>			
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MANAGEMENT

Men

Management of erectile dysfunction

Figure 1: Approach to assessment and management of erectile dysfunction

First-line treatments

Phosphodiesterase-5 (PDE5) inhibitors are effective and well-tolerated for neurogenic erectile dysfunction. In health, parasympathetic activation promotes release of nitric oxide (NO) during sexual arousal and stimulation which then increases 3',5'-cyclic guanosine monophosphate (cGMP) levels in smooth muscle cells of genital erectile tissue, leading to

penile engorgement and erection. cGMP is eventually broken down by PDE5 and return to flaccidity[16]. PDE5 inhibitors act by slowing the breakdown of cGMP, thus promoting and prolonging an erection, but sexual stimulation is still required for these medications to work.

There are four PDE5 inhibitors available in the United Kingdom (Table 5). They are taken on an as required basis before intended intimacy, although tadalafil can be taken daily in patients anticipating sexual activity at least twice a week. Adverse effects include headache, flushing and nasal congestion and rarely blue vision. PDE5 inhibitors are contraindicated in patients taking nitrates such as for angina. Efficacy is similar across all agents and choice of treatment will depend on the frequency of intercourse, personal experience and preference and cost. Sildenafil[31] and tadalafil[32] have been specifically evaluated in MS patients, demonstrating improvements in ability to achieve and maintain an erection and in several quality of life domains including sexual function, partner relationship and family life.

Table 5: The different phosphodiesterase-5 inhibitors available in the UK market

	Sildenafil	Tadalafil	Vardenafil	Avanafil
Trade name in the United Kingdom	Viagra	Cialis	Levitra	Spedra
Starting dose	50mg	10mg (5mg if continuous daily dosing)	10mg	100mg
Maximum dose	100mg	20mg	20mg	200mg
Onset of action	30-60min	30min	30min	15-30min
Duration of effect	4hr	36hr	4hr	5hr

Reduced absorption with fatty meal	Yes – avoid taking with food	No	Yes – avoid taking with food	Yes – avoid taking with food
Evidence in MS	Yes[31]	Yes[32]	No	No

PDE-5 inhibitors are the most convenient and well-tolerated treatment for erectile dysfunction. However not all patients report benefit and reasons for poor initial response include:

- Insufficient dose;
- Inappropriate timing between dosing and attempted sexual intercourse;
- Inadequate sexual stimulation as in foreplay in order to facilitate arousal;
- Hypogonadism and other untreated contributory risk factors to sexual dysfunction;
- Use of an unlicensed product.

While 25% of patients do not derive a satisfactory benefit from PDE-5 inhibitors, there is merit in trialling a different agent, as described in case 1. The medication should be tried on six to eight occasions before a patient can be classed as a non-responder[28]. These patients should be referred to a specialist for consideration of second-line therapies.

Second-line treatments

Vacuum constriction devices work by creating a vacuum when air is pumped out of a plastic tube placed around the penis (Figure 2a). This physically achieved erection is then sufficient for vaginal penetration. It can be used as add-on therapy to PDE5 inhibitors. Vacuum constriction devices have been shown to improve relationship satisfaction and frequency of

intercourse in patients with neurogenic erectile dysfunction[33] particularly those in stable relationships, engaging in infrequent sexual intercourse or have comorbidities requiring drug-free management[28]. However, satisfaction rates are limited by the need for manual dexterity, difficulty with ejaculation and achievement of an unnatural erection.

Another option is intracavernosal injection of alprostadil, a synthetic preparation of prostaglandin E1, which results in smooth muscle relaxation and erection even in the absence of sexual stimulation. Side effects include groin and penile pain, and less commonly priapism and penile fibrosis over the long-term. However, many patients are deterred by the need to inject into the penis and a high cessation rate has been observed amongst MS patients[34].

A penile prosthesis is third-line treatment for those desiring a permanent solution to erectile dysfunction. Despite high reported rates of patient and partner satisfaction, device failure and infection may necessitate revision surgery or explantation.

Management of ejaculatory dysfunction

Treatment options for anejaculation are limited. Yohimbine[35], a presynaptic α_2 -adrenergic receptor antagonist, and midodrine[36], an α_1 -adrenergic agonist have been shown to be effective in improving ejaculation and orgasm in uncontrolled studies. However, if the primary concern is infertility, appropriate referral should be made.

Management of premature ejaculation includes psychosexual counselling, education and behavioural treatments. Dapoxetine, a short-acting SSRI, which improves latency time to

ejaculation, is the only licensed pharmacotherapy in the UK but has not been studied in MS[37].

Women

Pharmacological options for sexual dysfunction in women are limited, but there are still a number of effective management strategies as illustrated in case 2. Given the effectiveness of sildenafil in treatment of sexual dysfunction in men, a randomised placebo-controlled trial studied its effect in women. While there was a small benefit in vaginal lubrication, there was no overall improvement in orgasmic function or quality of life[38]. Dyspareunia can be alleviated by anaesthetic and water-soluble lubricating gels, and if related to vaginal dryness from vulvovaginal atrophy such as in postmenopausal women, topical oestrogen has been found to improve clitoral sensitivity and reduce pain[12].

A vibrator can help when poor genital sensations are an impediment to intimacy (Figure 2b). These are readily available from shops and over the internet, although professional advice should be sought if satisfactory results are not initially experienced, in which case a higher frequency device may be more effective.

Figure 2: Non-pharmacological treatments for sexual dysfunction include (a) vacuum constriction devices for men with erectile dysfunction (images from www.imedicare.co.uk and www.mediplus.co.uk) and (b) vibrators for women with reduced genital sensation.

Management of secondary and tertiary contributing factors

Neuropathic pain and allodynia in the urogenital region can be treated with anticonvulsants (e.g. carbamazepine, lamotrigine, gabapentin), antidepressants (tricyclics, duloxetine), local anaesthetics and nonsteroidal analgesics[12]. However, caution is required as valproate and lamotrigine may worsen erectile dysfunction and have been associated with abnormalities of the menstrual cycle. Amongst the anticonvulsants, gabapentin, carbamazepine and oxcarbazepine are least likely to cause sexual dysfunction (Table 3).

Lower urinary tract dysfunction is prevalent in MS and in one study of women with bladder incontinence, 60% experienced sex-related incontinence. sexual dysfunction may improve after treatments for incontinence such as antimuscarinics, percutaneous tibial nerve stimulation, botulinum toxin[39] and emptying the bladder (such as by clean intermittent self-catheterisation) before intercourse. Antimuscarinics, commonly prescribed for overactive bladder symptoms, can lead to vaginal dryness, which can be relieved by lubricating gels. A suprapubic catheter may be a preferable route of catheterisation over a urethral indwelling catheter[9]. Faecal incontinence may be reduced by use of a microenema before or anal plug during intercourse[40].

In case fatigue is an impediment to intimacy, sexual activity may need to be synchronised with periods of higher energy levels. Fatigue itself can be addressed by energy conservation techniques and pacing tasks, assessing and managing underlying secondary causes, along with specific treatments including modafinil and amantadine. The position adopted during sexual activity might need to be modified depending upon the degree of neurological weakness and spasticity, with input from a physiotherapist or occupational therapist[12].

Spasticity can lead to painful adductor spasms during sexual activity and can be addressed by different therapies including oral or intrathecal baclofen, tizanidine, benzodiazepines, botulinum toxin and phenol. Baclofen has been associated with erectile dysfunction and anejaculation[12]. Strategic timing of anti-spasticity agents pre-emptively 30 to 60 minutes before sexual activity with stretching exercises based on physiotherapy advice can be a useful approach but does require some planning.

Whilst treating depression and mood disorders is important, SSRIs can compound sexual dysfunction, reduce or delay ejaculation and orgasm and contribute to genital numbness. As such, sexual dysfunction should be periodically enquired about in all patients on SSRIs and alternative treatments should be considered if there is an observed change in sexual functions whilst on these medications. The effect of SSRIs on sexual dysfunction is thought to be independent of presence of depression. In patients with major depressive disorder without existing sexual dysfunction, incidence of anorgasmia and worsened sexual function were lower in those taking bupropion than escitalopram, whilst depression scores were similar[41]. Other alternatives that have less impact on sexual functions include mirtazapine, moclobemide (a reversible monoamine oxidase A inhibitor) and agomelatine (an agonist of melatonin receptors MT1 and MT2, and antagonist at 5-HT_{2C}), which were found to have no difference in adverse impact on sexuality compared to placebo in a meta-analysis[42].

Sex therapy covers a broad range of aspects including education about sexual dysfunction, communication training, behavioural interventions and practical advice on positioning and use of sexual devices or aids. Sensate focus or body mapping techniques involve exploring extra-genital areas through various methods of touch to identify alternative erogenous zones to provide sexual enjoyment or pleasure. This may be beneficial for patients with genital

numbness or physical barriers to penetrative intercourse. Whilst evidence is limited, in one study, 9 couples who received 12 one-hour psychoeducation and counselling sessions with a psychologist, including cognitive behavioural therapy (CBT) and body mapping exercise had significantly improved sexual and marital satisfaction and problem solving communication[43].

Emotional and behavioural aspects of sexual dysfunction may benefit specifically from psychotherapy, such as CBT. Recurrent negative thoughts, such as about altered self-image and ability as a sexual partner, can lead to catastrophising about negative sexual outcomes. CBT helps to teach patients to critique such maladaptive thoughts, by assessing the evidence for and against the accuracy of that thought, and then to substitute it with a different, more positive way to think about the situation. Each time the patient is aware of the old thought, they should aim to counter and replace it with the new productive thought, such that over time this becomes an automatic process. CBT can also address anxiety and indirectly pain associated with sexual activity.

MS patients may lack an appropriate environment or privacy necessary for sexual activity, such as those living with a carer or other family members and in care facilities. It may be necessary to provide education of staff such that patients in residential care are not viewed as asexual.

A useful patient-centred framework to structure a discussion around sexual dysfunction and its management is the PLISSIT model (Giving Permission, Limited Information, Specific Suggestions, Intensive Therapy)[44] (Table 6).

Table 6: PLISSIT model of structuring a discussion around sexual dysfunction

	Description of step	Practical approach	Useful resources for patients
Permission	A health care professional gives permission for and encourages patients to express any concerns about sexual dysfunction. The opportunity to discuss these issues may itself be therapeutic.	A sensitive and open-ended approach encourages the patient to disclose symptoms they may find difficult to discuss.	Talking about sexual problems: https://www.mstrust.org.uk/a-z/talking-about-sexual-problems
Limited Information	Providing limited information about the physiology of sexual function and how symptoms of sexual dysfunction relate to the underlying neurological illness or associated contributing factors. This can help dispel myths about sexuality and	Use of illustrations or anatomic models may be helpful.	Diagrams of neurological control of sexual functions in females and males: https://www.msif.org/wp-content/uploads/2014/09/MS-in-focus-6-Intimacy-and-sexuality-English.pdf

	restore confidence in sexual activities.		
Specific Suggestions	Providing specific and appropriate suggestions targeted towards the patient's or partner's sexual dysfunction concerns.	This may include practical advice, such as products, alternative sexual positions, available medications and strategies to improve sexual function.	<p>Body mapping exercises: https://www.mstrust.org.uk/az/sexual-problems-women-ms#body-mapping</p> <p>Advice on sexual aids and other strategies to improve sexual function: Sex, Intimacy and Relationships (booklet): https://www.mssociety.org.uk/about-ms/signs-and-symptoms/sex-and-relationships/sex-and-relationship-problems, and MS, Sex and Intimacy, Section 9 Practical strategies to suggest to the patient: https://www.mstrust.org.uk/sites/default/files/MS%20%26%20Sex%20Guide%20INTERACTIVE.pdf</p> <p>Sex aids for people with disabilities: www.spokz.co.uk</p>

Intensive Therapy	If sexual dysfunction is not improved or resolved with the above steps, a small proportion of patients with complex cases, such as involving relationship conflicts or psychological factors, may require additional expertise	Such cases may require referral to a trained psychosexual therapist, psychologist or counsellor.	College of Sexual and Relationship Therapists can provide information on common sexual difficulties, relationship therapy and accredited therapists: https://www.cosrt.org.uk/
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CONCLUSIONS

Sexual dysfunction is a common symptom that affects patients with MS throughout the course of the condition. Perceived barriers by both patients and health care professionals result in its under-recognition and under-treatment. This article has outlined some strategies for evaluation, discussion and management of sexual dysfunction that can be used by neurologists during routine consultation, as well as situations where further specialist referral may be required.

CASE STUDIES

1. 35-year-old male

He reports a six-year history of relapsing remitting MS with previous brain and spinal cord relapses, currently stable on disease-modifying therapy brought up difficulties in achieving and maintaining erections during the consultation. A 2-year history of erectile dysfunction was leading to depressed mood, low self-esteem and relationship difficulties. Erections could be achieved but were weak and less prolonged. Early morning and nocturnal erections were present and he was still able to achieve orgasm and ejaculate.

During the course of the discussion several factors were found that could be contributing to sexual dysfunction including urinary incontinence, low mood and self-image and amitriptyline which he was taking for neuropathic pain.

Urinary incontinence was addressed by an antimuscarinic. As amitriptyline can contribute to erectile dysfunction, this was changed to gabapentin. He met a psychologist because of low mood. He was then commenced on sildenafil 50mg to be taken an hour before intended intimacy away from food. This improved ability to achieve but not maintain erections. The dosage was then increased to 100mg which was well tolerated and did help maintain erections but not consistently. Subsequently, sildenafil was changed to tadalafil because of more reliable absorption and longer duration of effect. At last review, he was satisfied with the effect of 20mg on demand dosing with no significant side effects.

The case demonstrates the role of medications in treating erectile dysfunction and secondary causes of sexual dysfunction, while recognising drugs that adversely affect sexual function.

2. 56-year-old woman

She had a 21-year history of MS and began experiencing sexual difficulties following a spinal cord relapse several years ago prior to entering secondary progressive MS. She was initially reluctant to discuss her sexual dysfunction, but was encouraged by a supportive MS team and during one visit revealed that she was experiencing poor vaginal sensation, reduced orgasms, as well as vaginal dryness. She was in a stable supportive relationship but frequency of sexual interactions had decreased as a result and she felt it difficult to discuss this with her partner. Lower limb spasticity and adductor spasms, which were worse in certain positions, also made intimacy more challenging. She had experienced menopause seven years earlier and as such, was referred to a gynaecology service where a pelvic assessment revealed vaginal atrophy, in keeping with her postmenopausal state.

She and her partner were introduced to different practical approaches during the initial appointment. A water-based non-flavoured lubricant was advised. She was asked to discuss the use of a topical oestrogen with her general practitioner for vaginal atrophy. It was also suggested that she try a short-acting antispasmodic agent before planned sexual activity to reduce spasticity.

The discussion was continued at her next follow up with the MS nurse. Given genital numbness, a body mapping exercise was suggested as a technique to explore other erogenous areas on the body that provide pleasure. She was also taken through different types of vibrators that she could try to help with enhancing genital sensations and encouraged to explore different positions with the aid of illustrations. Following the consultations, she and her partner felt more confident in exploring different strategies to enhance intimacy and returned to report satisfactory sexual activity.

This case illustrates the role of multidisciplinary input in managing sexual dysfunction, especially given the time constraints of a busy neurology clinic. This approach may be particularly relevant to women for whom there is a lack of pharmacological options.

KEY POINTS

- Sexual dysfunction is an under-reported and under-treated symptom in MS. Discussion of sexual dysfunction can be embedded in the neurological consultation.
- There are primary, secondary and tertiary contributing factors to sexual dysfunction in MS. This framework can help inform evaluation and management strategies.
- Examination and investigations are recommended in selected patients to exclude non-neurogenic causes of sexual dysfunction.
- A number of medications can worsen sexual dysfunction. In particular patients commencing SSRIs should be warned about this possibility and closely observed for changes in sexual functions.
- Many practical, non-pharmacological strategies can also improve sexual function and intimacy.

USEFUL RESOURCES FOR HEALTH CARE PROFESSIONALS AND PATIENTS

- MS and sex: A Consensus Guide for Healthcare Professionals by Healthcare Professionals:

<https://www.mstrust.org.uk/sites/default/files/MS%20%26%20Sex%20Guide%20INTERACTIVE.pdf>

- Sexual problems for men with MS (MS Trust): <https://www.mstrust.org.uk/a-z/sexual-problems-men-ms>
- Erectile dysfunction (MS Trust): <https://www.mstrust.org.uk/a-z/erectile-dysfunction>
- Sexual problems for women with MS (MS Trust): <https://www.mstrust.org.uk/a-z/sexual-problems-women-ms>
- Sex, intimacy and relationships (MS Society): <https://www.mssociety.org.uk/about-ms/signs-and-symptoms/sex-and-relationships/sex-and-relationship-problems>

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FIGURE AND TABLE LEGENDS

Figure 1: Approach to assessment and management of erectile dysfunction.

Abbreviations – erectile dysfunction: erectile dysfunction, HbA1c: haemoglobin A1c, PDE5: phosphodiesterase-5, vacuum constriction device: vacuum constriction device, ICI: intracavernosal injection.

Figure 2: Non-pharmacological treatments for sexual dysfunction include (a) vacuum constriction devices for men with erectile dysfunction (images from www.imedicare.co.uk and www.mediplus.co.uk) and (b) vibrators for women with reduced genital sensation.

Table 1: Domains of sexual function affected in males and females

Table 2: Factors that contribute to sexual dysfunction in patients with MS

Table 3: Medications for management of MS neurological symptoms known to affect sexual function and suggested alternatives

Table 4: Evaluation for non-neurogenic causes of sexual dysfunction and examples of indications for specialist referral

Table 5: The different phosphodiesterase-5 inhibitors available in the UK market

Table 6: PLISSIT model of structuring a discussion around sexual dysfunction

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